

RCE/1742  
#12

# REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Application Number	09/710,430
Filing Date	November 9, 2000
Examiner Name	Examiner H. Wilkins
First Named Inventor	S. Hanada
Group Art Unit	1742
Attorney Docket Number	11151/5

Subsection (b) of 35 U.S.C. § 132, effective on May 29, 2000, provides for continued examination of an utility or plant application filed on or after June 8, 1995.  
See The American Inventors Protection Act of 1999 (AIPA).

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application.  
**NOTE:** 37 C.F.R. § 1.114 is effective on May 29, 2000. If the above-identified application was filed prior to May 29, 2000, applicant may wish to consider filing a continued prosecution application (CPA) under 37 C.F.R. § 1.53 (d) (PTO/SB/29) instead of a RCE to be eligible for the patent term adjustment provisions of the AIPA. See Changes to Application Examination and Provisional Application Practice, Interim Rule, 65 Fed. Reg. 14865 (Mar. 20, 2000), 1233 Off. Gaz. Pat. Office 47 (Apr. 11, 2000), which established RCE practice.

1. Submission required under 37 C.F.R. § 1.114

- a. ☐ Previously submitted
- i. ☐ Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on (Any unentered amendment(s) referred to above will be entered).
- ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on
- iii. ☐ Other
- b. Enclosed
- i. ☐ Amendment/Reply
- ii. ☐ Affidavit(s)/Declaration(s)
- iii. ☐ Information Disclosure Statement (IDS)
- iv. ☒ Other Communication to the Office

2. Miscellaneous

- a. ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of \_\_\_\_\_ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(i) required)
- b. ☐ Other

3. Fees The RCE fee under 37 C.F.R. § 1.17(e) is required by 37 C.F.R. § 1.114 when the RCE is filed.

- a. ☒ The Director is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 11-0600
- i. ☒ RCE fee required under 37 C.F.R. § 1.17(e)
- ii. ☐ Extension of time fee (37 C.F.R. §§ 1.136 and 1.17)
- iii. ☐ Other
- iv. ☒ Charge any additional fees under 37 C.F.R. § 1.16 and 1.17
- b. ☐ Check in the amount of \$ \_\_\_\_\_ enclosed
- c. ☐ Payment by credit card (Form PTO-2038 enclosed)

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Name (Print /Type)	Dianoosh Salehi, Esq.	Registration No. (Attorney/Agent)	46,352
Signature	<i>Dianoosh Salehi</i>	Date	May 23, 2002

## CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner For Patents, Box RCE, Washington, DC 20231, or facsimile transmitted to the U.S. Patent and Trademark Office on:

Name (Print/Type)	110600 09710430
Signature	Date

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**FEE TRANSMITTAL**  
**for FY 2002**

Patent fees are subject to annual revision.

**TOTAL AMOUNT OF PAYMENT** (\$) 740.00**Complete if Known**

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First Named Inventor	S. Hanada et al.
Examiner Name	H. Wilkins
Group / Art Unit	1742
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**METHOD OF PAYMENT (check one)**

- 1.
- ☒
- The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit  
Account  
Number

11-0600

Deposit  
Account  
Name

KENYON &amp; KENYON

- ☒
- Charge Any Additional Fee Required
- 
- Under 37 CFR 1.16 and 1.17
- 
- ☐
- Applicant claims small entity status.
- 
- See 37 CFR 1.27

- 2.
- ☐
- Payment Enclosed:

☐ Check    ☐ Credit card    ☐ Money Order    ☐ Other
**FEE CALCULATION**

## 1. BASIC FILING FEE

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
101	740	201	370	Utility filing fee	
106	330	206	165	Design filing fee	
107	510	207	255	Plant filing fee	
108	740	208	370	Reissue filing fee	
114	160	214	80	Provisional filing fee	

**SUBTOTAL (1)**

(\$)

## 2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
20 **			
Independent Claims	3 **		
Multiple Dependent			

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description
103	18	203	9	Claims in excess of 20
102	84	202	42	Independent claims in excess of 3
104	280	204	140	Multiple dependent claim, if not paid
109	84	209	42	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

**SUBTOTAL (2)**

(\$)

\*\*or number previously paid, if greater; For Reissues, see above

**FEE CALCULATION (continued)**

## 3. ADDITIONAL FEES

Large Fee Code	Entity Fee (\$)	Small Fee Code	Entity Fee (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	400	216	200	Extension for reply within second month	
117	920	217	460	Extension for reply within third month	
118	1,440	218	720	Extension for reply within fourth month	
128	1,960	228	980	Extension for reply within fifth month	
119	320	219	160	Notice of Appeal	
120	320	220	160	Filing a brief in support of an appeal	
121	280	221	140	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,280	241	640	Petition to revive - unintentional	
142	1,280	242	640	Utility issue fee (or reissue)	
143	460	243	230	Design issue fee	
144	620	244	310	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Processing fee under 37 CFR 1.17 (q)	
126	180	126	180	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	740	246	370	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	740	249	370	For each additional invention to be examined (37 CFR § 1.129(b))	
179	740	279	370	Request for Continued Examination (RCE)	740.00
169	900			Fee for expedited examination of design application	

Other fee (specify)

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PATENT TRADEMARK OFFICE

\*Reduced by Basic Filing Fee Paid

**SUBTOTAL (3)**

(\$)

**SUBMITTED BY****Complete (if applicable)**

Name (Print/Type)	Dianoosh Salehi, Esq.	Registration No. Attorney/Agent)	46,352	Telephone	202-220-4200
Signature	<i>Dianoosh Salehi</i>			Date	May 23, 2002

**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

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11151/5

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

S. HANADA et al.

Serial No.: 09/710,430

Filed: Nov. 9, 2000

For: NOVEL TERNARY ALLOY AND  
APPARATUS THEREOF

Examiner: WILKINS, H.

Art Unit: 1742

COMMUNICATION WITH THE OFFICE

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Response to the Advisory Action mailed May 2, 2002,  
Applicants' remarks are as follows. The alloy composition in  
Araya is represented by weight percent (wt%). In contrast, the  
composition claimed in of the present application is in terms of  
atomic percentage (at%). Hence, referring to Table 1 of Araya,  
if the exemplary alloys (24) and (25) (having alleged  
composition: Ti-29wt% Nb-13wt% Ta-4.6wt% Sn) and exemplary  
alloys (26) and (27) (having alleged composition Ti-29wt% Nb-  
13wt% Ta-2wt %Sn) were represented in terms of atomic  
percentage, they would correspond to, respectively, Ti-20.3at%  
Nb-4.7at% Ta-2.5at% Sn and Ti-19.8at% Nb-4.6at% Ta-1.1at% Sn.  
Because the composition of the present application always  
comprises Sn in an amount of from 3 to 6 at%, the alloy  
composition of Araya and the present application would not

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overlap. Accordingly, Applicants respectfully submit that Araya does not anticipate the claimed invention.

In fact, if the representative composition described in the examples of the present application (Ti-14at%Nb-4at%Sn or Ti-16at%Nb-4at%Sn) were represented according to their weight percentage (wt%), they would respectively correspond to Ti-22.8wt% Nb-8.3wt %Sn or Ti-25.7wt% Nb-8.2wt% Sn. Even if the content of Sn were taken hypothetically to be 3 at% (corresponding to the lower limit defined in one embodiment of the invention), the composition Ti-15.5at% Nb-3at% Sn, for example, would still correspond to Ti-25.3wt% Nb-6.2wt% Sn. Clearly, the alloy composition of the present application does not overlap that of Araya, in which the Sn content is not greater than 5 wt%. For at least these reasons, Applicants respectfully submit that the claimed invention is not anticipated by Araya.

Applicants further note that (i) shape memory properties suitable for living organisms appear with an alloy composition which undergoes martensitic transformation when subjected to solution treatment and (ii) superelasticity suitable for the living organisms appears in the vicinity of the critical composition where the high temperature phase (body-centered cubic lattice structure) is frozen to room temperature while martensitic transformation is prevented during solution treatment of the composition. The optimum composition is represented by composition range if it is a multi-component alloy. Whether or not the high temperature phase is frozen depends on the alloy composition. In order to predict the critical temperature in a multi-component alloy, an empirical

formula called "molybdenum (Mo) equivalent" can be employed. The molybdenum equivalent is predicted from the freeze critical composition of Ti-X binary alloy. The molybdenum (Mo) equivalent  $[Mo]_{eq}$  of a multi-component alloy can be represented by the following equation:

$$[Mo]_{eq} = [Mo] + [Ta]/5 + [Nb]/3.6 + [W]/2.5 + [V]/1.5 + 1.25[Cr] + 1.25[Ni] + 1.7[Mn] + 1.7[Co] + 2.5[Fe]$$

See *Mechanical Properties Handbook "Titanium Alloys"*, ASM, 1994, pp. 5-11.

The critical composition in which the high temperature phase having a body-centered cubic lattice structure is frozen to room temperature is estimated to have a molybdenum equivalent  $[Mo]_{eq}$  of 10 wt%. This empirical formula is often employed to estimate the hardened phase of a multi-component alloy. However, Sn, which is related to the present application, is not included in this equation. Data on many titanium alloys show that Sn has little or no effects on the stability of high temperature phase. It is thus thought that Sn can be neglected.

However, as illustrated in the attached figure, the martensitic transformation initiation temperature ( $M_3$ ) or inverted transformation finish temperature ( $A_f$ ) which closely relates to shape memory properties or superelasticity is remarkably affected by the added amount of Sn. As can be seen in the attached figure, when the added amount of Sn falls within a range of from 4 to 5 at% (from about 8 to 10 wt%), the addition of Sn in an amount of 1 at% causes the transformation temperature to change by as much as not lower than 100°C. It can be further seen in the attached figure that superelasticity

normally appears at a temperature about 30°C higher than the inverted transformation finish temperature ( $A_f$ ) and a composition Ti-16at%Nb-4.9at%Sn is thus suitable for remarkable accomplishment of superelasticity at the body temperature (37°C). Thus, Applicants' discovery relating to the effect of Sn is both novel and unobvious. Also, Applicants disclosed that this effect of Sn appears when the content of Sn ranges from about 8 to 10 wt%, which is far higher than the Sn content of Araya (not greater than 5 wt%). For at least these additional reasons, Applicants respectfully submit that the claimed invention is both patentable over the art of record.

The calculation of molybdenum equivalent of the alloy composition described in the examples of Araya shows that the range is dispersed from 5.8 to 13.4. The critical composition in which the high temperature phase is frozen as determined by the alloy composition described in the examples of the present application is empirically found to be in the vicinity of Ti-12at%Nb-6at%Sn or Ti-16at%Nb-5at%Sn, and the molybdenum equivalent of which is 5.4 or 6.3, respectively. This demonstrates that the critical composition cannot be necessarily predicted from molybdenum equivalent alone. Thus, even if there may be an overlap of ranges, it can not necessarily be concluded that in every instance the composition of Araya behaves with the same elasticity and shape memory as that claimed by Applicants. For at least these reasons, Applicants respectfully submit that the claimed invention is patentable over Araya.

CONCLUSION

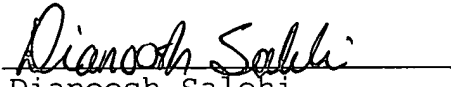
It is therefore respectfully submitted that claims 1 and 8-16 are now in condition for allowance. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

The Examiner is invited to contact the undersigned attorney if a telephonic communication is believed to be helpful in advancing the examination of the present application.

The Office is hereby authorized to charge any additional fees or credit any overpayments under 37 C.F.R. Section 1.16 or Section 1.17 to Deposit Account No. 11-0600.

Respectfully submitted,

Date: May 23, 2002

  
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